

# Achievement Objectives: Science Level 3 to 8

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Year Level:		7		8		9		10		11		12		13	
Strand	Sub-strand	Level 3		Level 4		Level 5		Level 6 NCEA Level 1		Level 7 NCEA Level 2		Level 8 NCEA Level 3			
Nature of science	Understanding about science	• Appreciate that science is a way of explaining the world and that science knowledge changes over time. • Identify ways in which scientists work together and provide evidence to support their ideas.				• Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through processes of logical argument.				• Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate.					
	Investigating science	• Build on prior experiences, working together to share and examine their own and others' knowledge. • Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.				• Develop and carry out more complex investigations, including using models. • Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. • Begin to evaluate the suitability of the investigative methods chosen.				• Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models.					
	Communicating science	• Begin to use a range of scientific symbols, conventions, and vocabulary. • Engage with a range of science texts and begin to question the purposes for which these texts are constructed.				• Use a wider range of science vocabulary, symbols, and conventions. • Apply their understandings of science to evaluate both popular and scientific texts (including visual and numerical literacy).				• Use accepted science knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the methods of communication and/or representation employed.					
	Participating and contributing	• Use their growing science knowledge when considering issues of concern to them. • Explore various aspects of an issue and make decisions about possible actions.				• Develop an understanding of socio-scientific issues by gathering relevant scientific information in order to draw evidence-based conclusions and to take action where appropriate.				• Use relevant information to develop a coherent understanding of socio-scientific issues that concern them, to identify possible responses at both personal and societal levels.					
Living World	Life Processes	• Recognise that there are life processes common to all living things and that these occur in different ways.				• Identify the key structural features and functions involved in the life processes of plants and animals. • Describe the organisation of life at the cellular level.		• Relate key structural features and functions to the life processes of plants, animals, and micro-organisms and investigate environmental factors that affect these processes.		• Explore the diverse ways in which animals and plants carry out the life processes.					
	Ecology	• Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.				• Investigate the interdependence of living things (including humans) in an ecosystem.		• Investigate the impact of natural events and human actions on a New Zealand ecosystem		• Explore ecological distribution patterns and explain possible causes for these patterns.		• Understand the relationship between organisms and their environment.			
	Evolution	• Begin to group plants, animals, and other living things into science-based classifications. • Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world.				• Describe the basic processes by which genetic information is passed from one generation to the next.		• Explore patterns in the inheritance of genetically controlled characteristics. • Explain the importance of variation within a changing environment.		• Understand that DNA and the environment interact in gene expression. • Explain how the interaction between ecological factors and natural selection leads to genetic changes within populations.		• Explore the evolutionary processes that have resulted in the diversity of life on Earth and appreciate the place and impact of humans within these processes. • Understand how humans manipulate the transfer of genetic information from one generation to the next and make informed judgments about the social, ethical, and biological implications relating to this manipulation.			
Planet Earth and Beyond	Earth systems	• Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources.		• Develop an understanding that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources.		Investigate the composition, structure, and features of the geosphere, hydrosphere, and atmosphere.		• Investigate the external and internal processes that shape and change the surface features of New Zealand.		• Develop an understanding of the causes of natural hazards and their interactions with human activity on Earth.		• Develop an in-depth understanding of the interrelationship between human activities and the geosphere, hydrosphere, atmosphere, and biosphere over time.			
	Interacting systems	• Investigate the water cycle and its effect on climate, landforms, and life.				• Investigate how heat from the Sun, the Earth, and human activities is distributed around Earth by the geosphere, hydrosphere, and atmosphere.		• Develop an understanding of how the geosphere, hydrosphere, atmosphere, and biosphere interact to cycle carbon around Earth.							
	Astronomical systems	• Investigate the components of the solar system, developing an appreciation of the distances between them				• Investigate the conditions on the planets and their moons, and the factors affecting them.		• Investigate the interactions between the solar, lunar, and Earth cycles and the effect of these on Earth.		• Explain the nature and life cycles of different types of stars in terms of energy changes and time.		• Explore recent astronomical events or discoveries, showing understanding of the concepts of distance and time.			
Physical world	Physical inquiry and physics concepts	• Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.				• Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.		• Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics). • Demonstrate an understanding of physical phenomena and concepts by explaining and solving questions and problems that relate to straightforward situations.		• Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of unfamiliar situations. • Analyse data to deduce complex trends and relationships in physical phenomena.		• Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of complex situations. • Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.			
	Using Physics					• Explore a technological or biological application of physics.		• Investigate how physics knowledge is used in a technological or biological application.		• Use physics ideas to explain a technological or biological application of physics.		• Use physics ideas to explain a technological, biological, or astronomical application of physics and discuss related issues.			
Material world	Properties and changes of matter	• Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials. • Compare chemical and physical changes.				• Investigate the chemical and physical properties of different groups of substances, for example, acids and bases, fuels, and metals. • Distinguish between pure substances and mixtures and between elements and compounds.		• Identify patterns and trends in the properties of a range of groups of substances, for example, acids and bases, metals, metal compounds, and hydrocarbons. • Explore factors that affect chemical processes.		• Investigate and measure the chemical and physical properties of a range of groups of substances, for example, acids and bases, oxidants and reductants, and selected organic and inorganic compounds.					
	Structure of matter	(not in this level)		Begin to develop an understanding of the particle nature of matter and use this to explain observed changes		• Describe the structure of the atoms of different elements. • Distinguish between an element and a compound, a pure substance and a mixture at particle level.		• Distinguish between atoms, molecules, and ions (includes covalent and ionic bonding). • Link atomic structure to the organisation of the periodic table. • Use particle theory to explain factors that affect chemical processes.		• Relate properties of matter to structure and bonding. • Develop an understanding of and use the fundamental concepts of chemistry (for example, equilibrium and thermochemical principles) to interpret observations.					
	Chemistry and society	• Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.				• Link the properties of different groups of substances to the way they are used in society or occur in nature.		• Investigate how chemical knowledge is used in a technological application of chemistry.		• Apply knowledge of chemistry to explain aspects of the natural world and how chemistry is used in society to meet needs, resolve issues, and develop new technologies.					